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Status and Activities Report

59th Medical Wing

Clinical Research

JBSA-Lackland Texas

(January 2017-December 2017)

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22 February 2018

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Status and Activities Report from the 59th Medical Wing

Clinical Research

(January 2017-December 2017)

Mission Description

Vision Statement

“Improve patient care through scientific inquiry, training, and education”

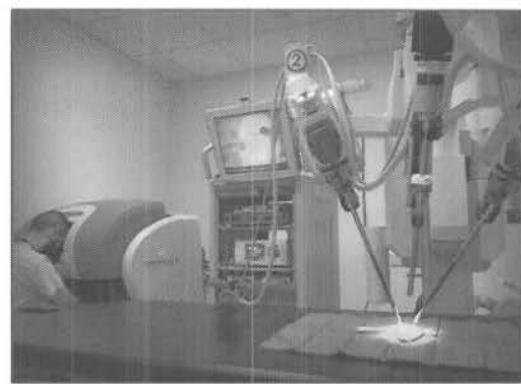
Mission Statement

“The 59th Clinical Research provides centralized administrative, technical and scientific support; regulatory oversight and guidance to researchers in the development, performance and dissemination of clinical investigations

Figure 1: An Operating Suite at CRD



Figure 2: Da Vinci Robot in the CRD Lab

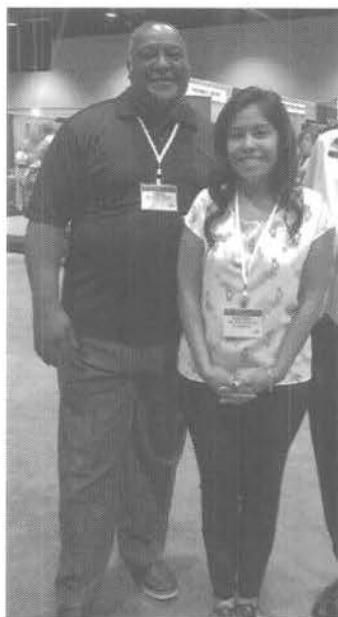


The 59th Medical Wing (59 MDW) is funded by the Defense Health Program. This overarching program has within it funds that are set aside for clinical research. This annual report pertains to the activities of the 59 MDW/ST Clinical Research which is historically and better known as the Clinical Research Division (CRD). The 59 MDW/ST CRD is a directorate within the Science and Technology Division (ST) that carries out Clinical Investigations and Research Support. Under the Clinical Investigation Program (CIP), the CRD manpower consisted of 15 total personnel dedicated to clinical investigations and research compliance and 48 personnel dedicated to clinical investigations. In Fiscal Year (FY) 2017, CRD funding received and executed from all sources totaled \$5.5M. CRD is a free-standing facility that contains a Support Branch, a Laboratory Branch, and an Operations Branch. Briefly, the Support Branch provides administrative support to the Institutional Review Board (IRB) and the Institutional Animal Care and Use Committee (IACUC). The Operations Branch supports Graduate Health Science Education (GHSE) surgical courses in one of CRD's three operating rooms (Figure 1), robotic surgery courses using the Da Vinci robot (Figure 2), human anatomy courses and clinical research surgical cases. The Laboratory Branch provides a full range of clinical laboratory testing for the care of the research subjects in the Operations Branch and for clinical

investigation studies. The CRD also serves as a one-stop shop for 59 MDW researchers' publications, presentations or other public dissemination of research-related material. CRD coordinates all documents through the relevant IRB or IACUC or Legal and with PAO. This service is to mitigate inappropriate disclosures that may produce adverse public perceptions, complicate or prevent procurements or licensing efforts or violate public laws. The CRD does not coordinate activities with the ST Office of Research and Technology Applications (ORTA). Researchers wishing to publically disclose a collaborative research or invention must contact the ST ORTA before doing so.

The CRD is the largest Air Force (AF) CIP. The CIP is governed by DoD Instruction 6000.08, *Defense Health Program Research and Clinical Investigation Programs*, 22 January 2014. The CIP aims to improve the quality of healthcare for Department of Defense (DoD) beneficiaries by generating an atmosphere of scientific inquiry, promoting an academic environment of high professional standing, and providing a means to assist in the accreditation of graduate medical education and other allied health training programs. The CRD CIP supports the operational training requirements for 45 GHSE and staff readiness programs (Appendix A). Graduate Medical and Graduate Dental Accreditation committees consider scholarly activity important in evaluating medical and dental education and training programs. In 2017 four GHSE programs were visited by the Accreditation Council and none were cited for a lack of scholarly activity. In addition, ST reported that the GME residency board pass rate in 2017 was over 90%.

Figure 3 CRD staff attended the 2017 Military Health System Research Symposium (MHSRS)



The CRD CIP funds regulatory oversight, subject protection, laboratory support for the development, performance, and validation of tests for clinical investigations, as well as maintaining and administering surgical and procedural training protocols and providing guidance for research protocol generation in support of student scholarly activities. The AF CIP program manager encourages the CRD CIP to fund training in regulatory compliance and temporary duty for personnel in support of the CIP program, such as attendance at the Military Health System

Research Symposium (MHSRS). Figure 3 shows two CRD staff members at the 2017 MHSRS meeting. Dr. Grant, Figure 1 (left), is the Director, Quality Assurance & Education, which is responsible for Post Approval Monitoring and Regulatory Compliance while Ms. Montez, Figure 1 (right) is the Chief of the Support Branch. In 2017 they both provided support to the testing of the DoD electronic regulatory compliance system for human subject protection for the Air Force. In addition, Dr. Grant was appointed as one of the Air Force Representatives to the Defense Health Agency's eIRB Information Technology Functional Verification and Validation team.

CIP funds are available to support GHSE research. CRD CIP funds were used to procure supplies and research specific equipment for GHSE USAF projects. Each project protocol must have a USAF principal investigator (PI) who is actively engaged in the research. The PI can be a GHSE fellow, resident or USAF staff or GHSE faculty. If the PI is a USAF Staff member or GHSE Faculty member there must be a USAF GHSE Fellow or Resident as an Associate Investigator. The CRD also managed the execution of two Air Force CIP intramural grant awards. Under the CIP intramural grant award program, AF principal investigators compete with other AF CIPs for funding for medical studies, analysis, and/or investigations conducted in local CIPs for the purposes of scholarly activity required for GHSE program accreditation.

The CRD had voting members in two 59 MDW chartered committees: the Human Research Protection Program Committee and the Scientific Advisory Committee. Both these committees are chaired by the 59 MDW Chief Scientist who forwards information to the 59 MDW Board of Directors. CRD staff also participated in the ST Integration Working Group, chaired by Dr. Grant. In addition, Dr. Bush was part of the review board for the Graduate Dental Program.

Finally, CRD supported research activities that chose to use the CRD for their research. These research activities are funded by non-CRD funds and align with the ST mission thrust areas. These thrust areas include En Route Care, Expeditionary Medicine, Force Health Protection and Operational Medicine as well as support to Nursing Research.

In 2017 the research projects conducted at 59 CRD Operations Branch and Laboratory Branch were: the use of arterial and venous shunting in the treatment of extremity vascular injury; identification of endpoints of resuscitation; strategies to prevent hypothermia in the deployed setting; regenerative and transplant medicine; effectiveness of refractive surgery for the warfighter; long term stability of dental implants and restorative materials, wound healing, antidotes for weapons of mass destruction, laparoscopic treatment of diseased and injured kidneys, traumatic wound treatment, vascular repair, PTSD in deployed airman, regenerative medicine, and blood substitute research. A number of these research protocols were survival protocols which were manpower intensive for CRD, more so because of manpower shortages.

Figure 4: Poster Presentation by Ms. Erica Dean



Figure 5: CRD Support to Research Involving MRI Technology



Significant Accomplishments Warranting Recognition

- Award Winning! Ms. Erica Dean, RN of the CRD Operations Branch, won the First Time presenters award at the 2017 Texas Branch of the American Association of Laboratory Animal Science. Ms. Dean, Figure 4 is also an Associate Investigator on the only Magnetic Resonance Imaging (MRI) protocol supported by the CRD, Figure 5. This was the subject of an AF CIP Program manager requested article and was entitled "*When Pigs Fly... Investigating Brain Injury in High-Altitude Pilots*". In December 2017, the Air Force purchased an MRI that will be used for GHSE scholarly activities and research support at the 59 MDW. When the MRI is installed and operational, this will enable the CRD to support more investigators wishing to carry out imaging studies of different parts of the body. In 2017 all research MRIs were carried out during the weekends so as not to interfere with patient care. The rationale for the research MRI is to have a dedicated research MRI to enable the research analyses to be carried out during normal duty hours.

- Accreditation First! This year the 59 MDW Human Research Protection Program (HRPP) became accredited by the Association for the Accreditation of Human Research Protection Programs (AAHRPP). With this accreditation, the 59 MDW is the first DoD organization to accredit its Human Research Protection Program. The CRD staff played a pivotal role in the on-site portion of the accreditation process. CRD hosted the on-site portion of the accreditation. CRD also ensured all the IRB AAHRPP questions of the submission package were addressed and all AAHRPP selected interviewees were prepared to answer questions. Key players in the accreditation domains were interviewed by AAHRPP public affairs in December 2017 because of AAHRPP's interest in the 59 MDW execution of the IRB's Ombudsman program. The DoD Human Research regulations requires all DoD IRBs to have an Ombudsman program to protect the rights of vulnerable populations. The 59 MDW has a robust Ombudsman program as its vulnerable population includes the 80,000 Basic Military trainees and technical trainees at Joint Base San Antonio-Lackland. As such, the 59 MDW HRPP was recognized as an area of distinction for its innovative practice by AAHRPP.

- Future Warrior Medics! As previously stated, the primary mission of the CRD is training. The CRD ensured 100% accreditation of 32 Air Force Graduate Medical Education (GME) programs in accordance with the Accreditation Council for Graduate Medical Education (ACGME) standards, 8 Graduate Dental programs on Joint Base San Antonio, 4 Biomedical Sciences Residency Programs, and the enlisted Pararescue training program.

The CIP successes directly affect Air Force Medical Services professions. CRD trainees include: nurses, physician assistants, surgeons, emergency medical technicians, independent duty technicians, and residents in all military healthcare fields. For example, in November, a CRD surgery team of ten civilians and one enlisted supported the 12-day Prosthodontics Update Course with their hands-on training portion for the Prosthodontics Flight of the 59th Dental Squadron. The feedback recognition letter to the CRD from the Director, Surgical Prosthodontics, Air Force Post Graduate Dental School included such responses as: "The

staff/tech availability was great! Can't say enough good things about this!" and "Overall, an excellent course. This was truly worth the time! I can't believe you guys were able to pull this off in such a short time!"

- The Highest Standards of Research Subjects Care! The CRD enforces the highest standards of care for our in-house research subjects. The facility is accredited by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) with "Emeritus" status, and 22 years of full accreditation. This year, the feedback from principal investigators has included compliments for the health of research subjects, especially their post-surgical care. The CRD caretakers take great pride in the facility and clean the rooms of CRD research subjects twice daily.

Figure 6: Pathology Support at the CRD



Figure 7: Histopathology Preparations at CRD



Highlighted above is the Pathobiology Section which is embedded within the Operations Branch. The US Army provides the CRD pathology support. In 2017, LTC Christensen, VC, USA (Figure 6), was the Army pathologist with duty at the CRD. She was assisted by Ms. Heather Brown, Figure 7, who prepared all tissue histology slides. The two-man pathobiology staff provided clinical investigative support to 20 projects in 2017 which included 12 research & development funded studies and 9 CIP-funded GHSE projects.

In 2017 while the CRD was awaiting civilian personnel hiring of the CRD's Laboratory Animal Medical Officer (LAMO), LTC Christensen took on this duty full-time for eight months. For this, she was recognized by the Air Force with the award of the Air Force Commendation Medal.

Evidence of Mission Support

- Committed to Research! The CRD protocol staff supported 28 new protocols in 2017 (18 human and 10 animal) and by December the protocol office had 108 Human studies, 134 Non-Research projects, 71 Exempt studies, 34 External studies, 2 HUD studies, and 42 Animal studies.

The support staff provided assistance to two 59 MDW boards: the Institutional Review Board and the Institutional Animal Care and Use Committee as well as the 59 MDW Assigned Institutional Officials for HRPP and the Institutional Official for the 59 MDW Animal Care Program. The support staff maintained all the research files, the research data base, the

administrative tasks needed for research compliance, the IRB, and the IACUC, delivery documents for review and approval to the AIOs, IO and USAF, and they ensured all research training folders were maintained.

In addition, the Support Branch Chief oversaw the publications and presentation staff who routed their documents for clearance by Public Affairs and placed cleared documents into the Defense Technical Information Center, as needed, in accordance with medical wing instructions. In FY 2017, 409 publications and presentations were submitted for clearance through the CRD.

Figure 8: Molecular Biology Support to GHSE Scholarly Activity-methylation study data

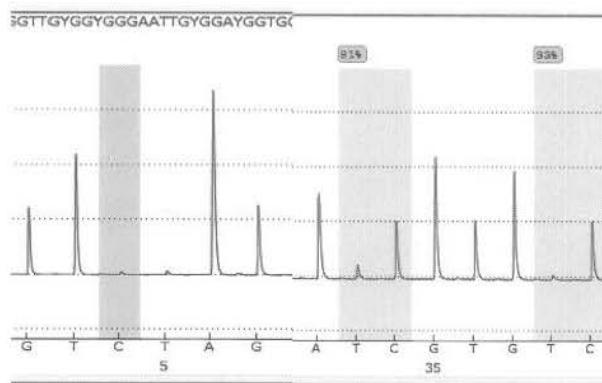


Figure 8 shows the result of data produced by the Molecular Biology Section of the Laboratory Branch. This is a figure from one of two resident projects that were conducted at, and funded by, the CRD which was selected for a poster display at the December Senior Leaders Meeting at the Defense Health Agency. This poster was presented by Dr. Gibbons, CRD Laboratory Branch Chief. The first study he highlighted was in support of Captain Jonathon Thomas' protocol entitled "Adverse childhood experience and serotonin transporters: a gene environmental interaction study of the risk of Post-Traumatic Stress Disorder (PTSD) in soldiers (ACES)." Staff at the CRD are analyzing the genotypes of subjects with PTSD as well as control subjects without PTSD to identify genes that may be linked to this disease. The second study CRD highlighted was in support of Captain Michael R. Hossack's protocol where the CRD is testing methylation status of the human genome to test Hossack's hypothesis which states "after controlling for combat exposure and adversity, methylation levels will distinguish soldiers with PTSD from those without. Early adversity will correlate with methylation status of the genes studied as well as PTSD presence and severity."

The Laboratory Branch has five sections and in 2017 supported 35 projects. Each member of the laboratory branch directly supports a principle investigator. Mr. Longoria, Figure 9 is pictured with CRD's scanning electron microscope. In 2017 Mr. Longoria was the point of contact (POC) for three studies: an evaluation of tryptase and histamine in systemic allergy reactions, the hemodynamic effects of closed chest compressions and a pilot study on ureteral stenting after endoscopic and laparoscopic injury.

Figure 9: CRD Scanning electron microscope



Figure 10: Microbiology Preparations

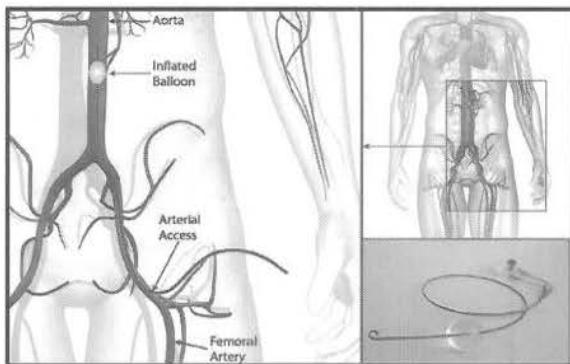


Figure 10 shows Ms. Henrichs demonstrating microbiology plating. In 2017 she supported six microbiology projects. These projects included dental studies on the effects of cleaning solutions on plaque removal, surface roughness, and hardness of occlusal devices; effects of tooth brushing on the longevity of surface characterization on hybrid ceramic materials; and the effectiveness of various disinfection and sterilization methods on mirror sleeves of a dental unit. The results of these dental studies were cleared for presentation in December 2017. Ms. Henrichs also supported other microbiology studies such as a 6-month evaluation of antibiotic graft patency in a polymicrobial infection setting and a study of sustained corticosteroid release from a therapeutic contact lens delivery system for prevention of a post-photorefractive keratectomy scar.

Figure 11: CRD Hematology Analysis



Figure 12: Scheme of Research on Hemorrhage Control



Hemorrhage due to injury on the battlefield remains a difficult problem and another member of the laboratory staff, Ms. Banfield, Figure 11, supported four hematology research projects. Figure 12 shows the scheme of one of these research projects that aims to test whether the abdominal aortic and junctional tourniquet will be as effective as resuscitative endovascular balloon occlusion of the aorta in achieving hemostasis.

- First-Class Training! The CRD has trained 285 personnel in human (CITI training) and animal research subject protection (AALAS) and 1344 staff and residents took part in surgical skills training at the CRD at a cost of over \$850K. Also, in 2017 about \$1,731,000 in CIP funding was

allocated to support research protocols. CRD active participation in protocols produced 131 peer reviewed journals, articles, publications, 1 book chapter, 277 presentations and 122 Defense Technical Information Center submissions.

-Funding Support! Figures 13 and 14 show the FY17 funding received by the CRD and the projected funding for FY 18 as briefed to the Medical Research and Acquisition Working Group in December 2017. The funds received from the AFMS were in support of the Clinical Investigations Program. The 59 MDW and AETC funds supported training protocols and 6 FTE contract support positions. R&D funding was received for the High Altitude study of the 711 HPW and three FTEs to support RDT&E cases carried out at the CRD.

Figure 13 CRD Funding FY2017

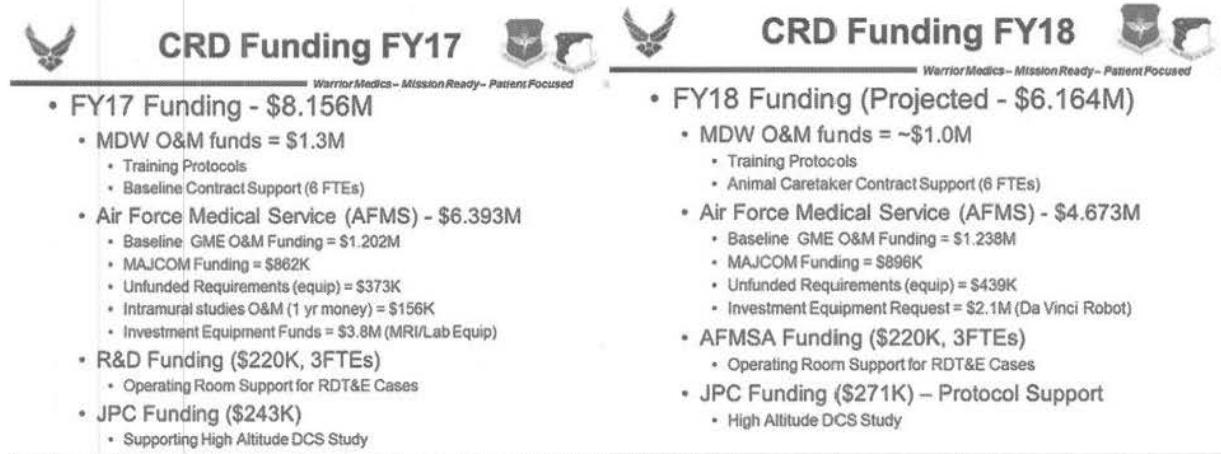


Figure 14 CRD Funding FY2018

In FY18 there are a number of unfunded requirements for equipment in support of GHSE protocols.

Demonstrated Professional and Technical Performance

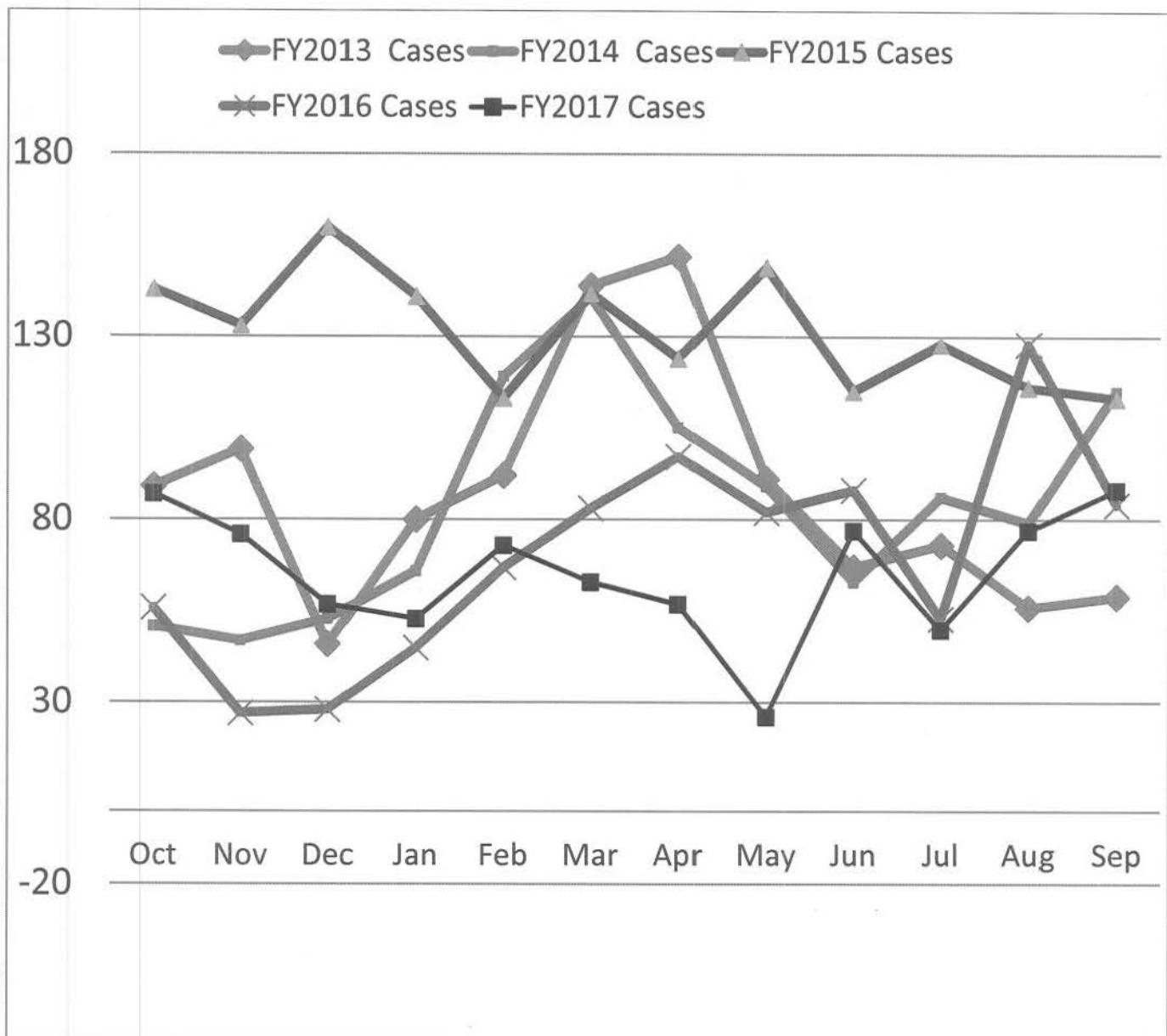
- Stellar program! The CRD is re-accredited with full accreditation “Emeritus” status by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) in 2016. The animal research program at the CRD vivarium has the ability to house seven (7) different species for research and medical training. In 2017 facility projects were carried out to upgrade the environmental control of animal facilities adjacent to the CRD and at the paddock location.

Throughout 2017 the animal holding capacity of the CRD for swine has been a topic of much interest. The CRD was designed for support of projects using research grade farm animals and our contracts are set up for the purchase of these animals. The interest in the CRD holding capacity is for studies using research specific pathogen-free animals. This will be a slow process. First, a contract to support researchers requiring pathogen-free animals will take three years. Second, each vendor offers species that are pathogen-free for different pathogens so researchers will need to account for that. For example, each vendor's pathogen-free swine requires separate indoor housing because each vendor provides animals that are free of different specific pathogens. Third, the Air Force did not have a medical research program when the CRD

was built so the CRD has limited capability to house and care for indoor animals. CRD was constructed with only nine animal rooms in its vivarium and the size of each room will limit the capacity to hold large animals. The CRD building next to the paddock would require major construction for animal holding. To make this building acceptable, the HVAC system would need to be upgraded as well as the flooring and drainage systems of the building.

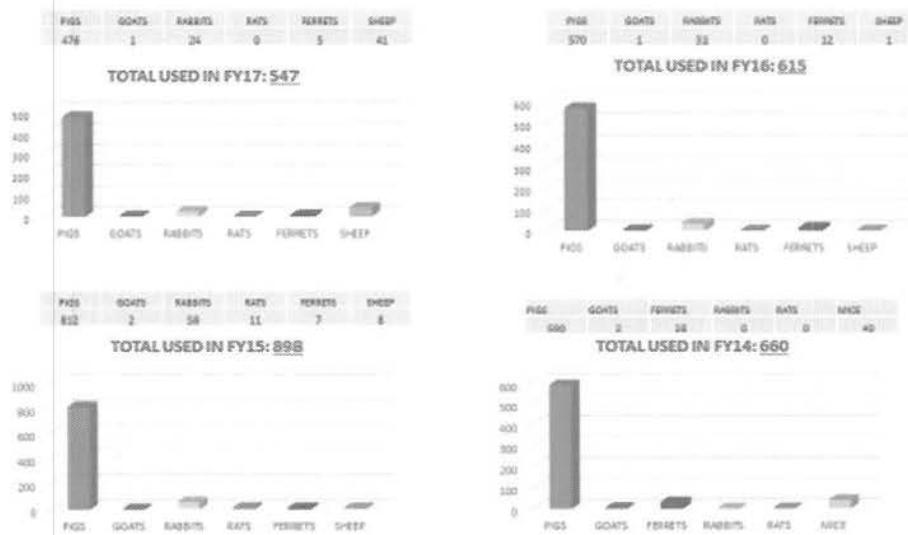
Figure 15 below shows the productivity of the CRD surgical suite from 2013 to 2017 as briefed to the Medical Research and Acquisition Working Group in December 2017.

Figure 15 Surgical cases from FY2013 to FY2017



The number of cases reflects the number of animals that were recovery animals and the renovations being carried out that limited. However, as Figure 16 below shows, over the past 4 years the majority of the animals used are swine. The 25,000 sq. ft. vivarium has large animal

Figure 16 Animal Usage FY2014 to FY2017

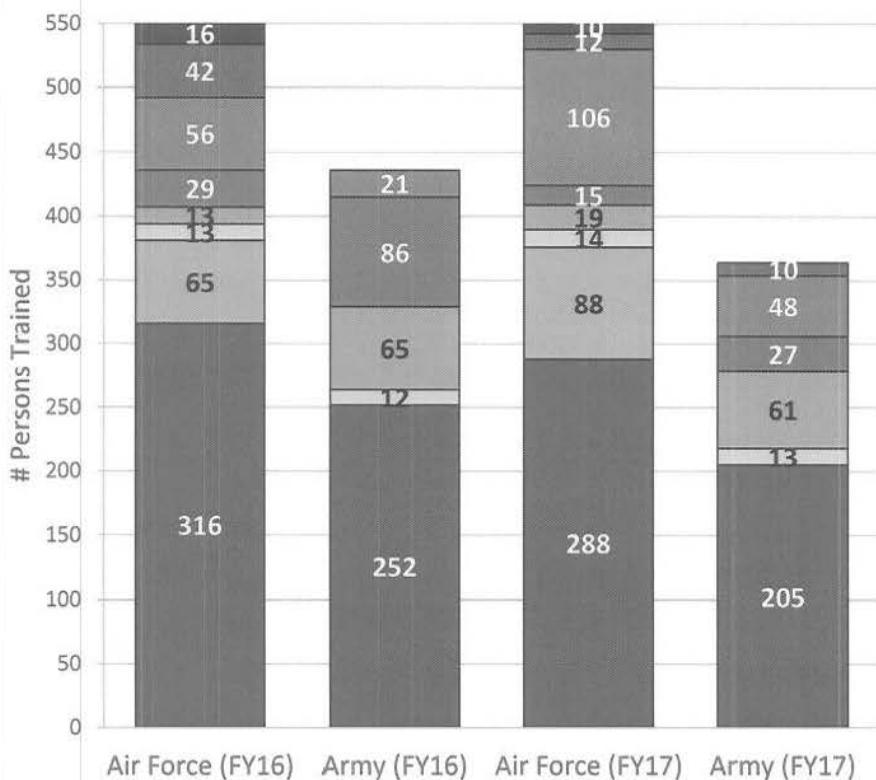


cages; adjacent to the CRD are large animal cages and multi-animal runs; and the 28,000 square foot paddock can house non-specific pathogen free animals..

- Blended Training! The CRD assists GHSE directors with training by filling the gaps of current simulators and didactic training to maintain a “bench-to bedside” program of education, training and research to support high quality, cost-effective healthcare to military beneficiaries. Figure 17 shows the number of trainees in FY2016 and FY2017 that received this gap training. In 2016, 986 medics were trained and when the 59 MDW Board of Directors (BOD) was briefed in November, 2017, CRD had 1,200 trainees.

The Air Force Surgeon General’s Regulatory Compliance Office ensures that training protocols at the CRD are only approved if there is no alternative. CRD had 9 training protocols in 2017. In July 2017, according to the Acting Deputy Assistant Secretary of Defense Health Readiness Policy and Oversight, based on qualitative assessment of expert opinions at this point in time, the DoD body of knowledge supports this gap training. This training was last briefed to the BOD in 2014. At that time only four publications were available that were relevant to the training conducted by the CRD. This year the number of publications had increased to 23.

Figure 17 Slide prepared in August 2017 of the number of trainees receiving gap training at the CRD



The histogram in Figure 17 is split between the number of Air Force and Army personnel who received training. The red area is Emergency Skills training. In 2017, 493 trainees completed Emergency Skills training. The orange area is the PJ training and 88 PJs completed their training at the CRD. The yellow is urology laparoscopic training and 27 personnel completed this training in 2017. The dark green represents ECMO (adult) and green is ECMO pediatric training. In 2017, 42 personnel had adult ECMO training and 80 had pediatric ECMO training. The light blue represents vascular/endovascular training and 154 personnel had this training at the CRD in 2017. The blue is ophthalmology training and only 22 personnel had this. The dark blue is the SAUSHEC Dermatology training with only 10 trainees. Medical providers e.g., combat medics, PJs, physicians, nurses, and PAs all received this training. In addition, the figure shows that the CRD trains as many soldiers as airmen. Shared training supports development of air-ground teams of medics.

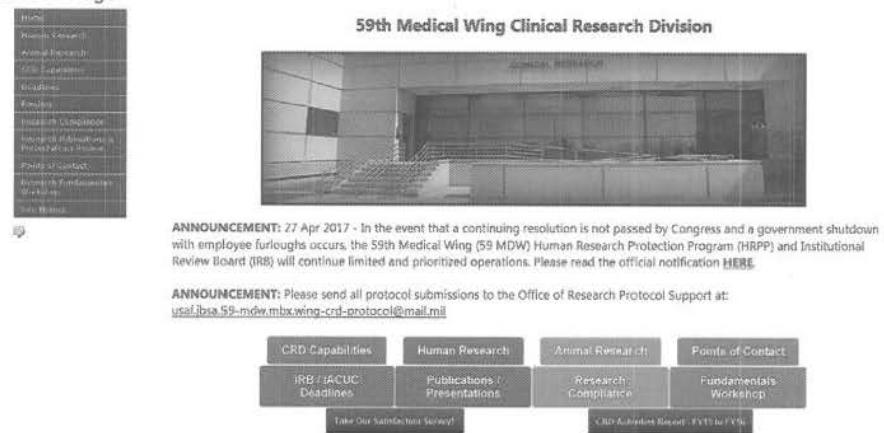
- CIP/R&D Synergy! In 2017 the CRD provided quarterly and annual reports to the USAF CIP program manager, the 59 MDW Scientific Advisory Board and the HRPP Committee. Projects highlighted to the USAF CIP are listed in Appendix B. The CRD conducted 59 audits of human protocols to ensure research compliance. The CRD sponsored a Clinical Investigation Research Training course for the graduate medical education program in September 2017. The course had over 80 attendees. CRD staff supported 11 IRB meetings and 11 IACUC meetings. In FY17 there were 27 R&D surgical protocols supported by the CRD which provided a Laboratory

Animal Medical Officer, a Board Certified Veterinary Pathologist, 17 CRD baseline personnel (Surgical techs, vet techs, and a nurse, 3 R&D funded surgical techs (project manager/researcher) and 6 FTEs in the protocol support office. This also included 26 post approval monitoring audits and 192 surgical cases which entailed over 30,000 procedures including post-operative evaluations and treatments. CRD logistics personnel also supported 8 R&D accounts by ordering \$300K in supplies for surgical cases and processing 18 equipment packages of which \$355K in equipment was procured through the CRD. The CIP initiatives also enhanced R&D in three different ways. The first is by expanding throughput. The CIP added animal isolation rooms to accommodate specific species, has modified manpower support contracts to support research and has made scheduling changes (split shifts) to meet protocol requirements. The CIP also procured equipment that may have a synergistic effect on R&D. This includes the 2017 MRI that will be operational in late summer 2018 and the unfunded requests for a CT scanner at the CRD and a Da Vinci Surgical Robot replacement. Finally, the CIP has developed new tools to support the R&D/GME mission specifically new contracting vehicles to acquire equipment and creating BPAs to expedite high cost supply requirements.

- VIP Tourist Destination! In 2017, the 59 MDW CRD received several hundred visitors mostly from the Gateway Academy and visiting DoD and USAF Research Program leads. During these visits the CRD showcased ongoing joint training, joint research and USAF projects in progress by the Operations and Laboratory Branches.

- Real-Time Information! Up-to-date information continues to be added to the CRD website. This is an important source for student research information, IRB and IACUC policies and instructions, information on laboratory capabilities, publications and presentations, and many other CIP-related topics and links to the CRD which were created by ST from other 59 MDW web-pages. The CRD website is:
<https://kx.afms.mil/kj/kx8/ClinicalResearchJBSALackland/Pages/home.aspx>.

Figure 18: CRD Web Page



CRD points of contact are listed in Appendix C.

Appendix A

List of GHSE Programs

MEDICAL RESIDENCY	PROGRAMS
ADOL	Adolescent Medicine
ALGYIM	Allergy & Immunology
ANES	Anesthesiology
CARDIO	Cardiology
CYTO	Cytopathology
DERM	Dermatology
EMERG	Emergency Medicine
EMUS	Emergency Ultrasound
ENDO	Endocrinology
GASTRO	Gastroenterology
HEMONC	Hematology/Oncology
INTMED	Internal Medicine
INFDIS	Infectious Disease
NEONAT	Neonatology
NEURO	Neurology
NUCMED	Nuclear Medicine
OBGYN	Ob/Gyn
OPHTH	Ophthalmology
ORTHO	Orthopaedics
OTOLAR	Otolaryngology
PAIN	Pain Medicine
PATH	Pathology
PEDS	Pediatrics
PULMCC	Pulmonary Critical Care
RADMSK	Musculoskeletal Radiology
RADS	Diagnostic Radiology
RADTRA	Trauma Radiology
RHEUM	Rheumatology
SLEEP	Sleep Medicine
SURG	Surgery
SURGCC	Surgical Critical Care
UROL	Urology

DENTAL RESIDENCY	PROGRAMS
ORTHODON	Orthodontics
AEGD-2	Advanced General Dentistry
ENDODON	Endodontics
ORALSURG	Oral Surgery
PROSTH	Prosthodontics
PERIO	Periodontics
MAXILO	Maxillofacial
HOSDEN	Hospital Dentistry

BSC RESIDENCY PROGRAMS	
PA	PA Training
NM	Nutritional Medicine
SW	Social Work
PSYCH	Clinical Psychology

ENLISTED TRAINING PROGRAMS	
ParaRescue	Pararescue Training Protocol

Appendix B

HIGHLIGHTED PROJECTS

Significant Studies (titles and brief descriptions of studies that have contributed to general medical knowledge or may result in important modifications in MTF or field) that were reported to SG5 in FY2017 were:

FWH20160019A: Evaluation of XSTAT Compared to Combat Gauze in a Coagulopathic Model of Uncontrolled, Junctional Hemorrhage in *Sus Scrofa*. **Publication:** Evaluation of Xstat and Quick Clot Combat Gauze in a Swine Model of Lethal Junctional Hemorrhage in Coagulopathic Swine J Special Operations Med 2017

FWH20160028A: Comparison of different resuscitation fluids in volume-controlled and uncontrolled hemorrhage models over time in swine (*Sus Scrofa*) **Presentation:** Investigation of intravenous hydroxocobalamin compared to Hextend for resuscitation in a swine model of uncontrolled hemorrhagic shock: A preliminary report. NACCT, Vancouver, Canada

FWH20140070A: Intravenous versus intramuscular cobinamide compared to intravenous saline (control) in the treatment of acute, survivable, hydrogen sulfide toxicity in swine (*Sus Scrofa*). **Presentation:** Efficacy of intramuscular cobinamide in a swine model of hydrogen sulfide poisoning. NACCT, Vancouver, Canada

FWH20160044A: Aortic Hemostasis and Resuscitation (AHR): Advanced Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for Non-compressible Torso Hemorrhage (NCTH) and Reversal of Hemorrhage-Induced Traumatic Cardiac Arrest (HiTCA) in a Swine Model (*Sus scrofa*), study. **Publication:** The use of the Abdominal Aortic and Junctional Tourniquet During Cardiopulmonary Resuscitation Following Traumatic Cardiac Arrest in Swine J Military Med 2017 **Publication:** Hemodynamic effects of the Abdominal Aortic and Junctional Tourniquet in a hemorrhagic swine model Jason M. Rall, PhD,a James D. Ross, PhD,b,* Michael S. Clemens, MD, Jennifer M. Cox, BS, Theresea A. Buckley, MS, and Jonathan J. Morrison, MD, PhD, FRCS. Journal of Surgical Research, 30 Jan 17 2017 (212(159-166)). **Presentation:** Comparison of Zone 3 Resuscitative Balloon Occlusion of the Aorta (REBOA) and the Abdominal Aortic and Junctional Tourniquet (AAJT) in a Model of Non-Compressible Pelvic Hemorrhage in Swine. MHSRS 2017, Orlando, FL

[401740-1] Differences in Examination of Common Orthopaedic Images and Surgical Videos Between Orthopaedic Residents and Orthopaedic Attending Surgeons REFERENCE #: C.2014.133d Presented at the Society of Military Orthopaedic Surgeons, Squaw Valley, CA, 12-16 Dec 16 (GME Project supported by 59th CRD Funding)

FWH20110158A - Quality of cardiopulmonary resuscitation when directing the area of maximal compression by transesophageal echocardiography during cardiac arrest in swine (sus scrofa). "Left Ventricular Compressions Improve Hemodynamics in a Swine Model of Out-of-Hospital Cardiac Arrest" has been published on Taylor & Francis Online. It is available at: <http://www.tandfonline.com/doi/full/10.1080/10903127.2016.1241328>

Protocol C.2015.036 Coordinated training for 59th MDW pathologist to enhance interpretation of cancer markers with Fluorescent In-Situ Hybridization (FISH). CRD staff optimized FISH biomarkers from 50 FFPE tissue samples for study entitled "MYC and BCL-2 double Immunohistochemistry on Diffuse Large B Cell Lymphoma (DLBCL)". Arranged for visiting professor from UT Health Science Center to lead training session on interpretation of FISH.

Protocol C.2014.122d Molecular section completed validation for 9 separate epigenetic markers for PTSD study entitled Adverse childhood experience and serotonin transporters: a gene environmental interaction study of the risk of PTSD in soldiers (ACES). 3 of the assays were designed and developed by CRD Lab Branch.

Appendix C

Points of Contact

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